

Flow Diagram: Early management of suspected Community Acquired Pneumonia – Under 5

Clinical features consistent with possible CAP:
Cough, fever, breathlessness, tachypnoea, chest recession, crackles /wheeze on auscultation

Does patient fulfil NICE criteria for high or moderate-high risk of sepsis (see overleaf)

Yes

Follow NICE sepsis guidance (initial management outlined overleaf-return to this algorithm for specific pneumonia management guideline)

No

Signs of severe pneumonia present (see box on right)

Yes

Consider performing a Chest X-Ray (Antero-Posterior) particularly in those:

- with hypoxaemia
- with significant respiratory distress

No

Clinical suspicion of complicated pneumonia (absent breath sounds, dull to percussion, decreased chest expansion)

Yes

Obtain Chest X-Ray
Venous Blood Tests for:

- blood culture
- full blood count
- C-reactive protein
- urea and electrolytes
- creatinine

Commence Intravenous Antibiotics

No

Unable to tolerate oral fluids or absorb oral antibiotics (e.g. because of vomiting)

Yes

Commence intravenous antibiotics (consult local antibiotic guidelines)
CXR NOT routinely indicated

No

Commence oral Amoxicillin (use macrolide antibiotics if mycoplasma or chlamydia pneumonia suspected)
CXR NOT routinely indicated
Blood and Microbiological investigations NOT routinely indicated

Consider possible complicated pneumonia if no significant clinical response after 48 hours

Features of Severe Pneumonia:

- Tachypnoea (>70 bpm under 12 months age, >50bpm over 12 months)
- Moderate/severe recession (<12 months)
- Severe difficulty breathing (>12 months)
- Grunting
- Nasal Flaring
- Apnoea (<12 months)
- Cyanosis
- Tachycardia (>170 bpm under 6 months, >160 bpm 6-12 months, >150 bpm 1-3 years, >140 3-5 years)
- Capillary Refill Time ≥ 2 secs
- Hypoxaemia (sustained oxygen saturation <92% in room air)
- Not feeding (< 12 months)
- Signs of dehydration (>12 months)

Sepsis risk stratification tool: children aged under 5 years in hospital

High risk criteria

- Behaviour:
 - no response to social cues
 - appears ill to a healthcare professional
 - does not wake, or if roused does not stay awake
 - weak high-pitched or continuous cry
- Heart rate:
 - aged under 1 year: 160 beats per minute or more
 - aged 1–2 years: 150 beats per minute or more
 - aged 3–4 years: 140 beats per minute or more
 - heart rate less than 60 beats per minute at any age
- Respiratory rate:
 - aged under 1 year: 60 breaths per minute or more
 - aged 1–2 years: 50 breaths per minute or more
 - aged 3–4 years: 40 breaths per minute or more
 - grunting
 - apnoea
 - oxygen saturation of less than 90% in air or increased oxygen requirement over baseline
- Mottled or ashen appearance
- Cyanosis of skin, lips or tongue
- Non-blanching rash of skin
- Temperature:
 - aged under 3 months: 38°C or more
 - any age: less than 36°C

1 or more high risk criteria met

Arrange immediate review by senior clinical decision maker (paediatric or emergency care ST4 or above or equivalent)

Carry out venous blood tests for the following:

- blood gas for glucose and lactate
- blood culture
- full blood count
- C-reactive protein
- urea and electrolytes
- creatinine
- clotting screen

Give intravenous antibiotics without delay (within a maximum of 1 hour)

Discuss with consultant

Lactate over 4 mmol/L

Lactate 2–4 mmol/L

Lactate less than 2 mmol/L

Give intravenous fluid (bolus injection) without delay and within 1 hour. Discuss with critical care

Give intravenous fluid (bolus injection) without delay and within 1 hour

Consider intravenous fluid (bolus injection) without delay and within 1 hour

Carry out observations at least every 30 minutes or continuous monitoring in emergency department
Consultant to attend (if not already present) if the person does not improve

Moderate to high risk criteria

- Behaviour:
 - not responding normally to social cues
 - no smile
 - wakes only with prolonged stimulation
 - decreased activity
 - parent or carer concern that child is behaving differently from usual
- Heart rate:
 - aged under 1 year: 150–159 beats per minute
 - aged 1–2 years: 140–149 beats per minute
 - aged 3–4 years: 130–139 beats per minute
- Respiratory rate:
 - aged under 1 year: 50–59 breaths per minute
 - aged 1–2 years: 40–49 breaths per minute
 - aged 3–4 years: 35–39 breaths per minute
 - oxygen saturation less than 92% in air or increased oxygen requirement over baseline
 - nasal flaring
- Capillary refill time of 3 seconds or more
- Reduced urine output, or for catheterised patients passed less than 1 ml/kg of urine per hour
- Pallor of skin, lips or tongue
- Temperature:
 - aged 3–6 months: 39°C or more
- Leg pain
- Cold hands or feet

2 or more moderate to high risk criteria met

- Carry out venous blood tests for the following:
- blood gas for lactate
 - blood culture
 - full blood count
 - C-reactive protein
 - urea and electrolytes
 - creatinine

Clinician review and results review within 1 hour

Lactate over 2 mmol/L
escalate to high risk

Lactate 2 mmol/L or less
definitive condition diagnosed?

If no definitive condition identified, repeat structured assessment at least hourly

Ensure review by a senior decision maker within 3 hours for consideration of antibiotics

Only 1 moderate to high risk criterion met

Clinician review and consider blood tests within 1 hour

Can definitive condition be diagnosed and treated?

NO

Low risk criteria

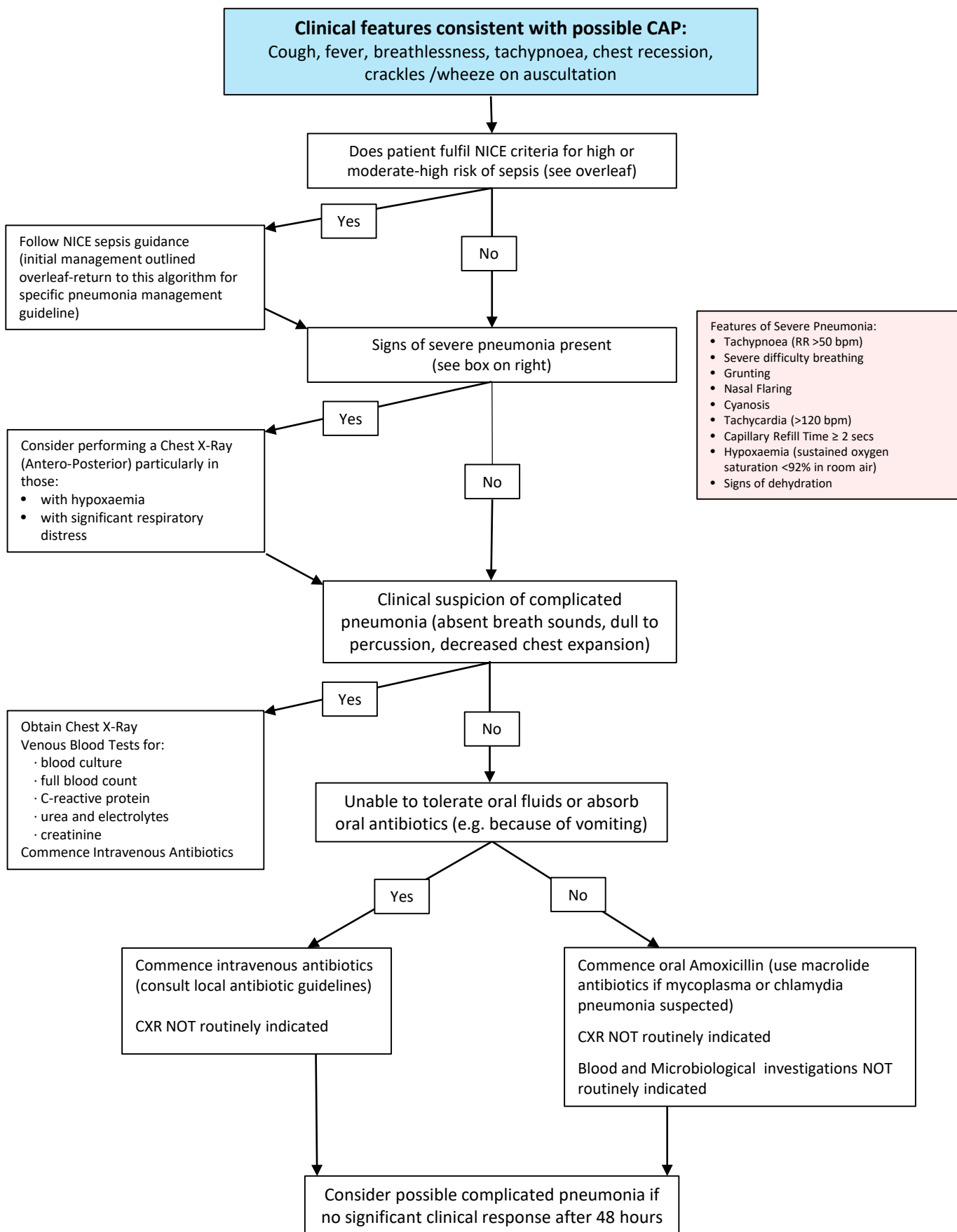
- Responds normally to social cues
- Content or smiles
- Stays awake or awakens quickly
- Strong normal cry or not crying
- No high risk or moderate to high risk criteria met
- Normal colour

Suspected sepsis, no high or high to moderate risk criteria met

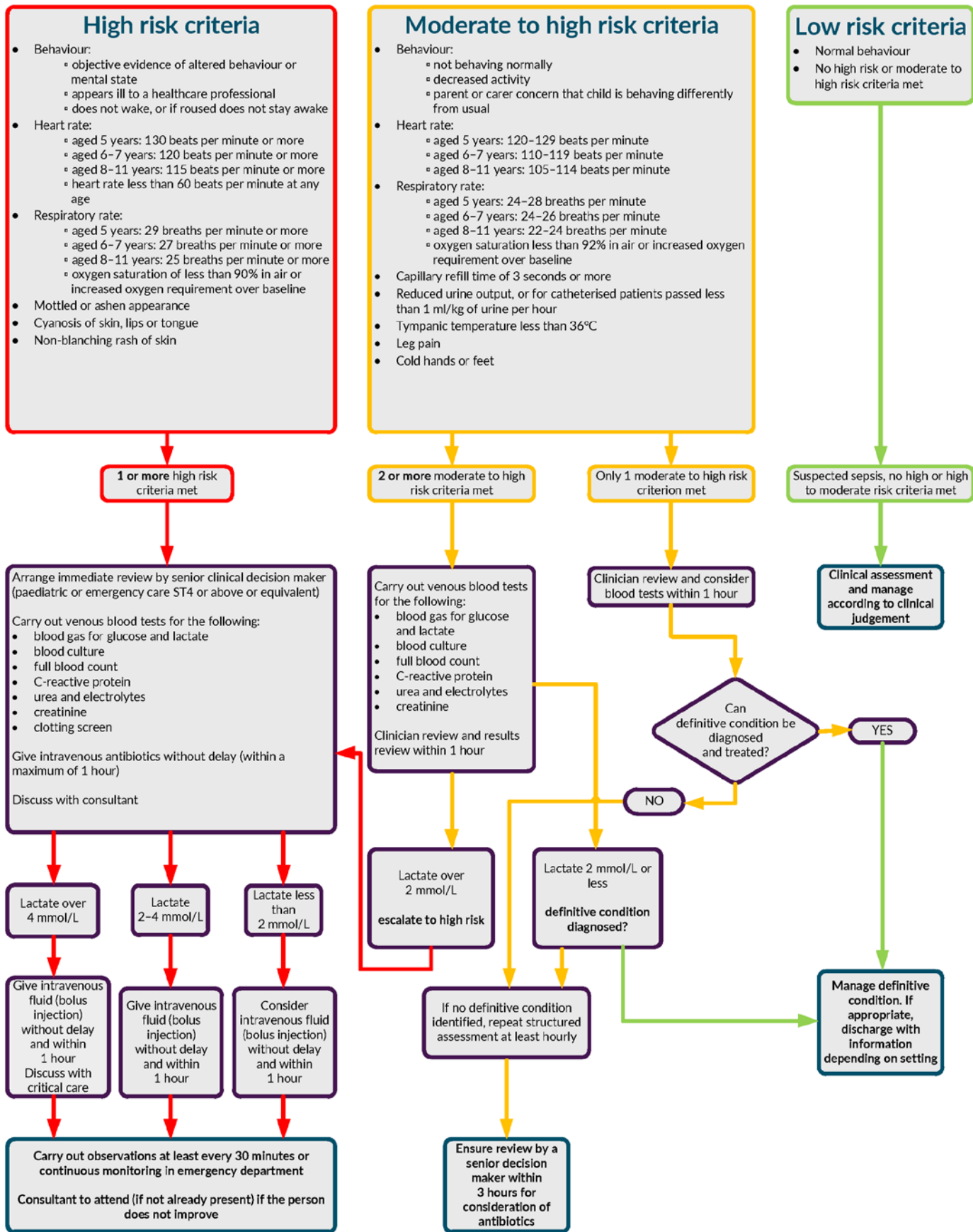
Clinical assessment and manage according to clinical judgement

Manage definitive condition. If appropriate, discharge with information depending on setting

Flow Diagram: Early management of suspected Community Acquired Pneumonia – 5-11 years

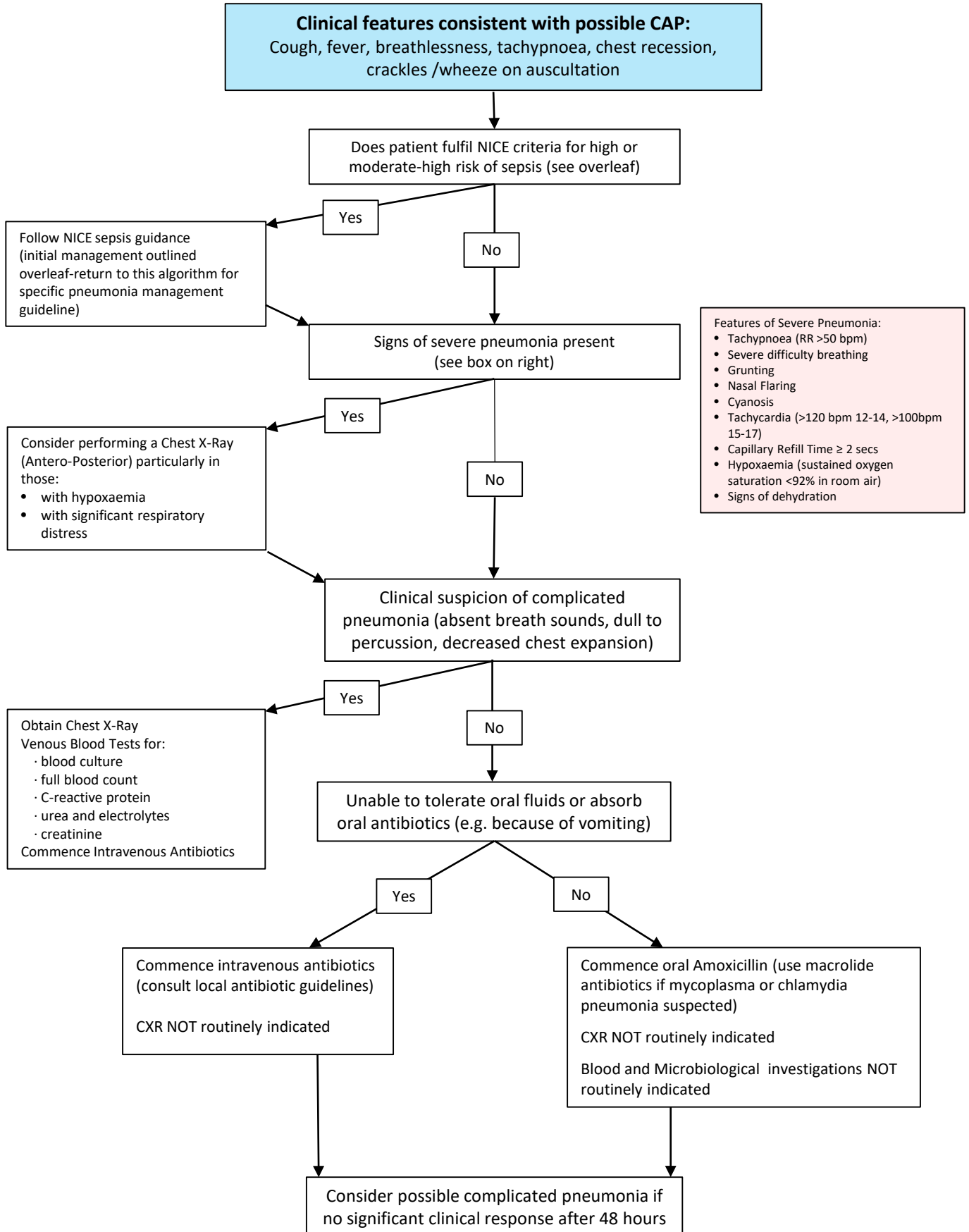


Sepsis risk stratification tool: children aged 5-11 years in hospital



Flow Diagram:

Early management of suspected Community Acquired Pneumonia – 12-17 years



Sepsis risk stratification tool: children and young people aged 12-17 in hospital

High risk criteria

- Behaviour:
 - objective evidence of new altered mental state
- Heart rate:
 - all ages: more than 130 beats per minute
- Respiratory rate:
 - all ages: 25 breaths per minute or more **OR**
 - new need for 40% oxygen or more to maintain saturation more than 92% (or more than 88% in known chronic obstructive pulmonary disease)
- Systolic blood pressure:
 - all ages: 90 mmHg or less **OR**
 - more than 40 mmHg below normal
- Not passed urine in previous 18 hours, or for catheterised patients passed less than 0.5 ml/kg of urine per hour
- Mottled or ashen appearance
- Cyanosis of skin, lips or tongue
- Non-blanching rash of skin

Moderate to high risk criteria

- Behaviour:
 - history from patient, friend or relative of new onset of altered behaviour or mental state
 - history of acute deterioration of functional ability
- Impaired immune system (illness or drugs, including oral steroids)
- Trauma, surgery or invasive procedures in the last 6 weeks
- Respiratory rate: 21-24 breaths per minute
- Heart rate:
 - all ages: 91-130 beats per minute
 - for pregnant women, 100-130 beats per minute
- New-onset arrhythmia
- Systolic blood pressure 91-100 mmHg
- Not passed urine in the past 12-18 hours, or for catheterised patients passed 0.5-1 ml/kg of urine per hour
- Tympanic temperature less than 36°C
- Signs of potential infection:
 - redness
 - swelling or discharge at surgical site
 - breakdown of wound

Low risk criteria

- Normal behaviour
- No high risk or moderate to high risk criteria met
- No non-blanching rash

1 or more high risk criteria met

2 or more moderate to high risk criteria met **OR** systolic blood pressure of 91-100 mmHg

Only 1 moderate to high risk criterion met

Suspected sepsis, no high or high to moderate risk criteria met

Arrange immediate review by senior clinical decision maker (paediatric or emergency care ST4 or above or equivalent)

Carry out venous blood tests for the following:

- blood gas for glucose and lactate
- blood culture
- full blood count
- C-reactive protein
- urea and electrolytes
- creatinine
- clotting screen

Give intravenous antibiotics without delay (within a maximum of 1 hour)

Discuss with consultant

Carry out venous blood tests for the following:

- blood gas for glucose and lactate
- blood culture
- full blood count
- C-reactive protein
- urea and electrolytes
- creatinine
- clotting screen

Clinician review and results review within 1 hour

Clinician review and consider blood tests within 1 hour

Clinical assessment and manage according to clinical judgement

Can definitive condition be diagnosed and treated?

YES

NO

Lactate over 4 mmol/L **OR** systolic blood pressure less than 90 mmHg

Lactate 2-4 mmol/L

Lactate less than 2 mmol/L

Give intravenous fluid (bolus injection) without delay and within 1 hour. Discuss with critical care

Give intravenous fluid (bolus injection) without delay and within 1 hour

Consider intravenous fluid (bolus injection) without delay and within 1 hour

Carry out observations at least every 30 minutes or continuous monitoring in emergency department

Consultant to attend (if not already present) if the person does not improve

Lactate over 2 mmol/L **OR** assessed as having acute kidney injury* **escalate to high risk**

Lactate 2 mmol/L or less and no acute kidney injury* **definitive condition diagnosed?**

If no definitive condition identified, repeat structured assessment at least hourly

Manage definitive condition. If appropriate, discharge with information depending on setting

Ensure review by a senior decision maker within 3 hours for consideration of antibiotics

* see NICE's guideline on Acute kidney injury (CG169)